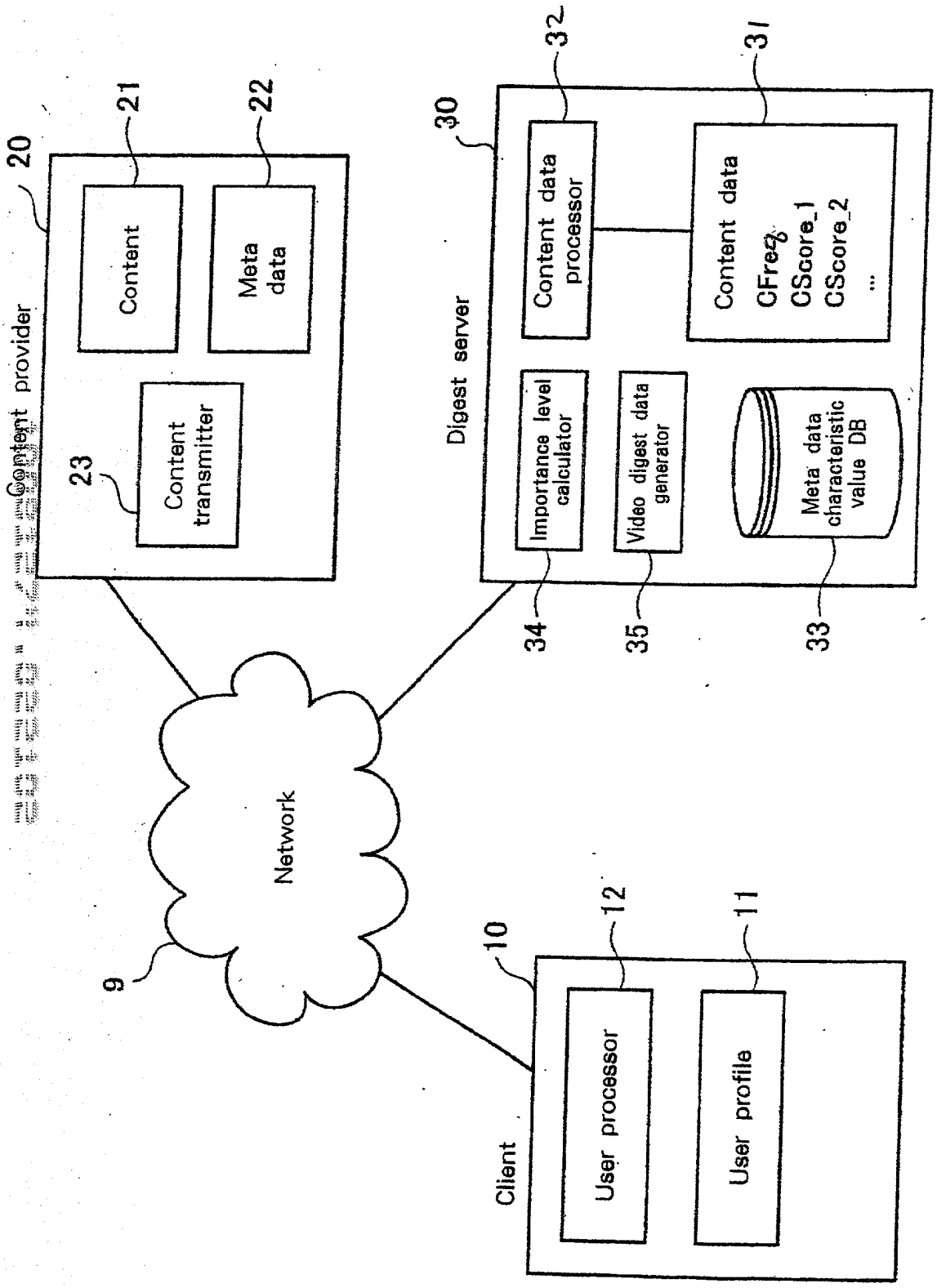

Content provider
20
21
Content
22
Meta data
23
Content transmitter
Digest server
30
32
Content data processor
31
Content data
CFreq
CScore_1
CScore_2
...
Importance level calculator
34
Video digest data generator
35
Meta data characteristic value DB
33
Network
9
Client
10
User processor
12
User profile
11

FIG. 1

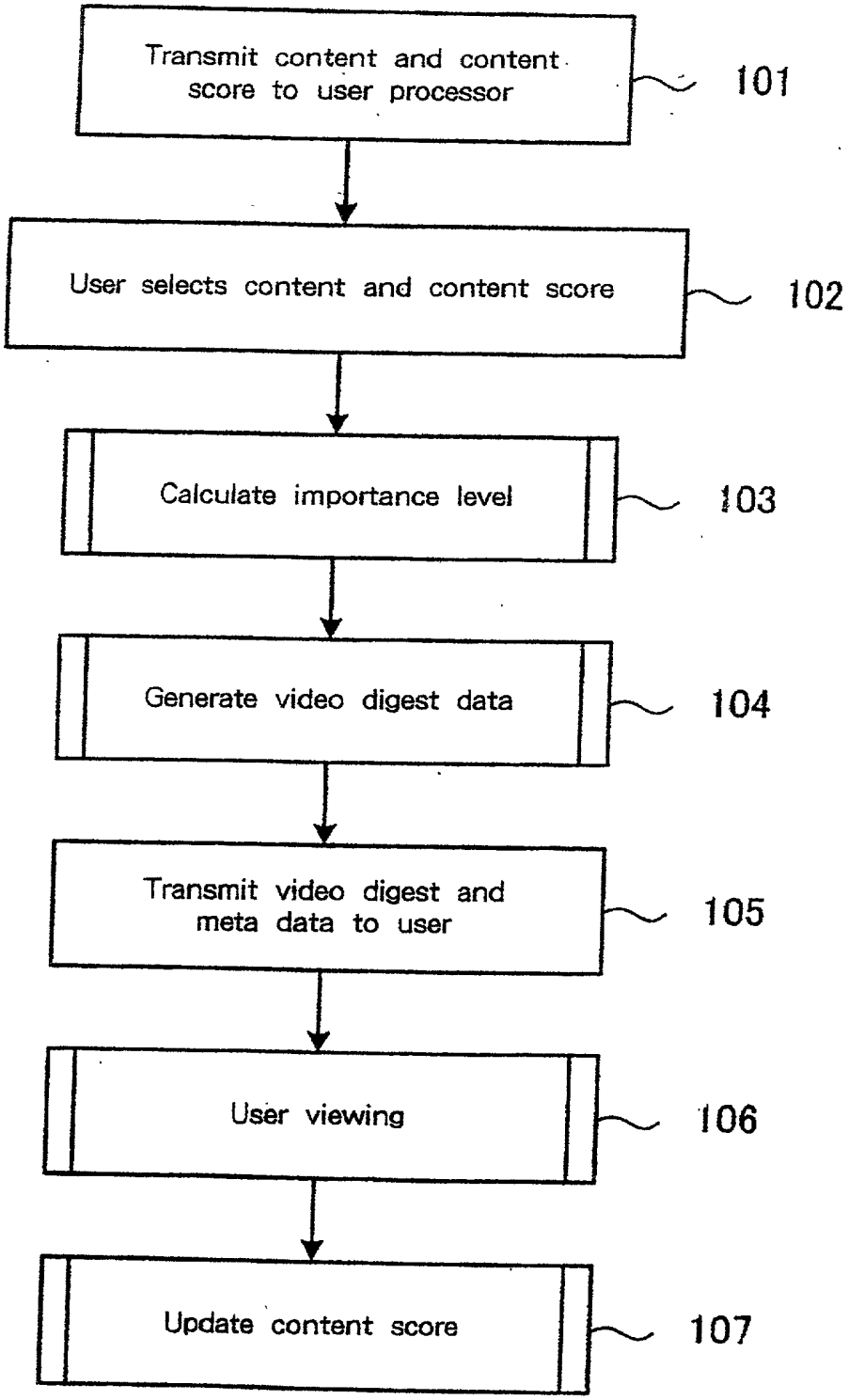

Transmit content and content score to user processor
101
User selects content and content score
102
Calculate importance level
103
Generate video digest data
104
Transmit video digest and meta data to user
105
User viewing
106
Update content score
107

FIG. 2

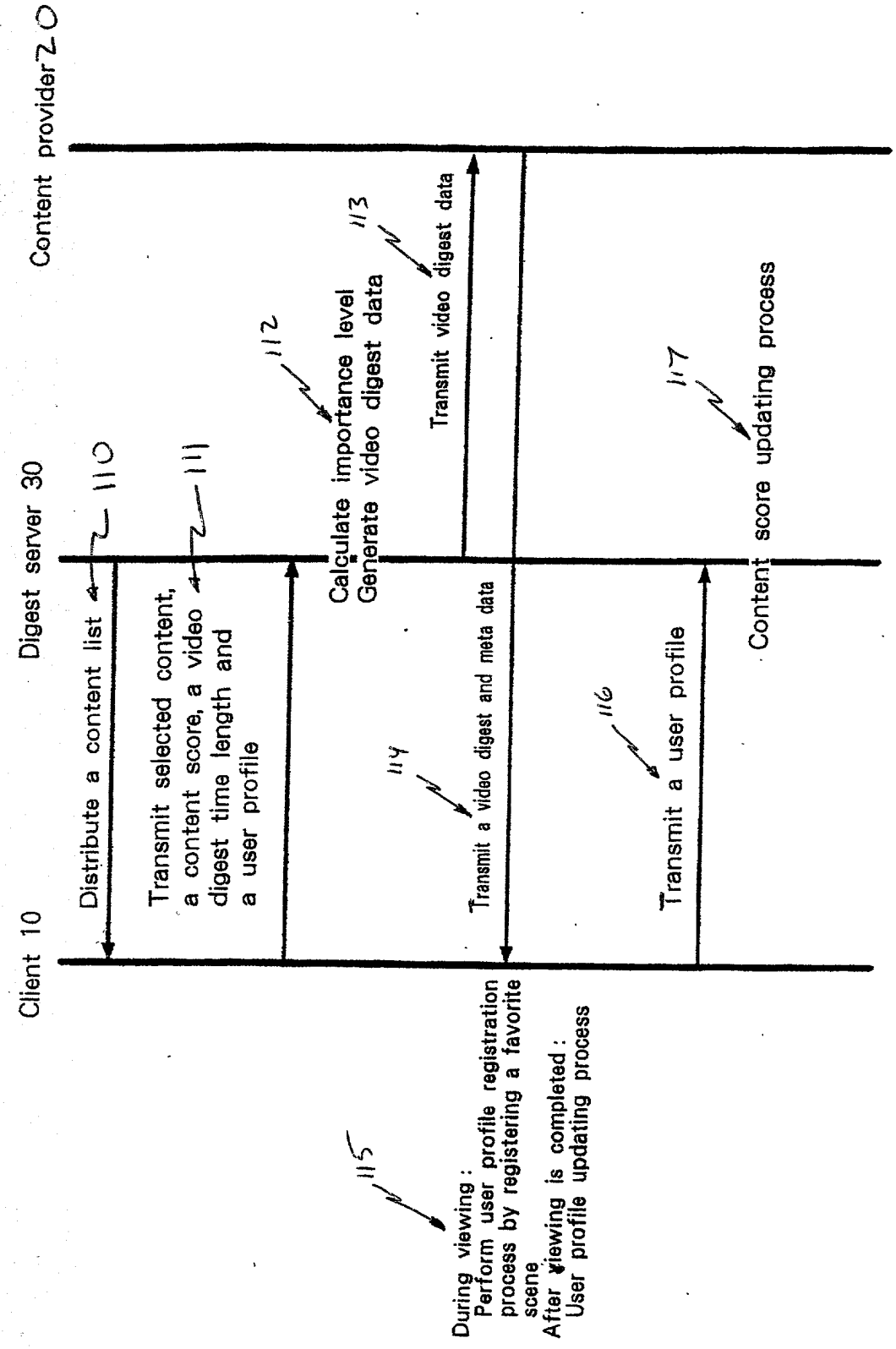

Client 10
Digest server 30
Content provider 20
Distribute a content list
110
Transmit selected content, a content score, a video digest time length and a user profile
111
Calculate importance level
Generate video digest data
112
Transmit video digest data
113
Transmit a video digest and meta data
114
During viewing :
Perform user profile registration process by registering a favorite scene
After viewing is completed :
User profile updating process
115
Transmit a user profile
116
Content score updating process
117

FIG. 3

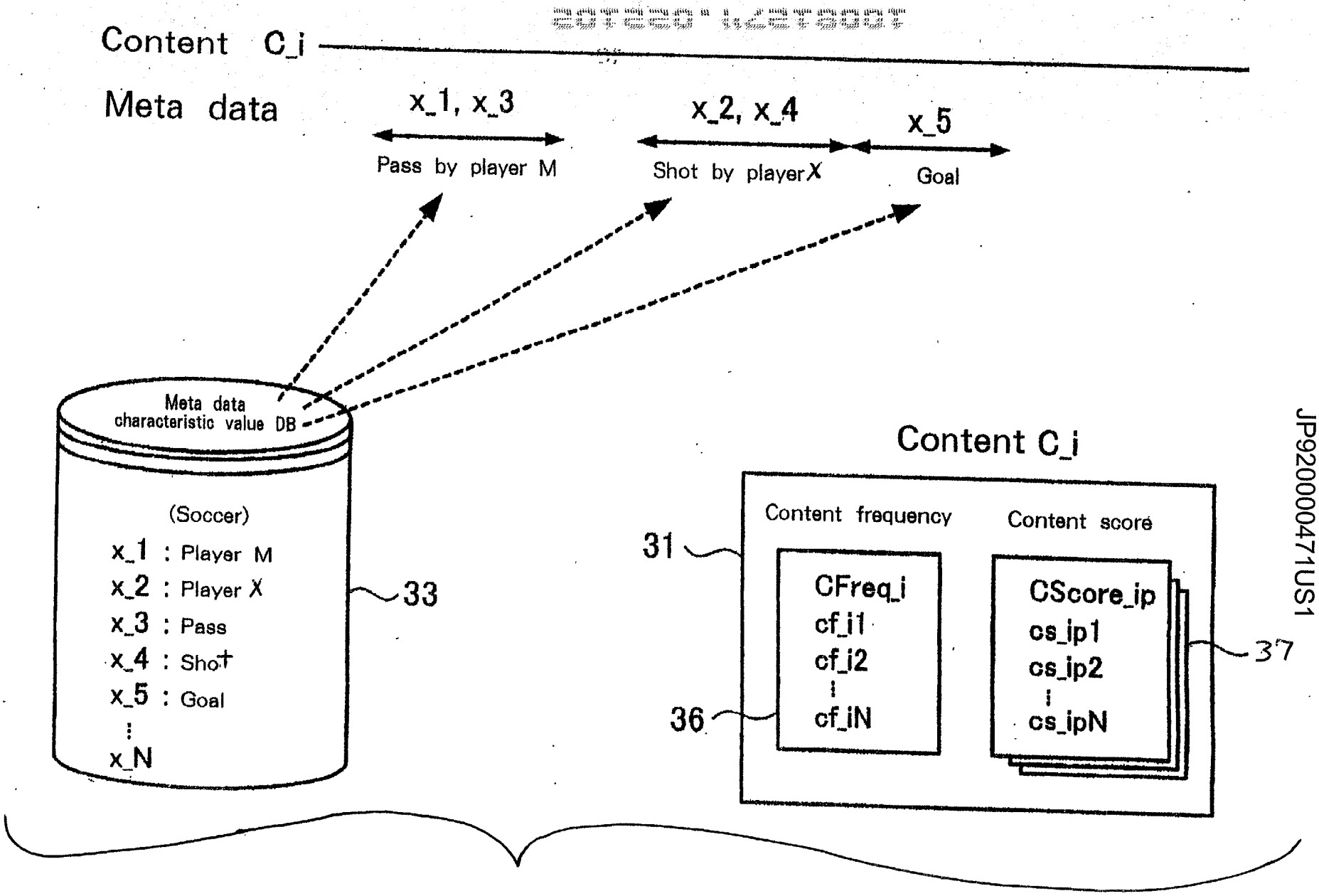

Content C_i
Meta data
x_1, x_3
Pass by player M
x_2, x_4
Shot by player X
x_5
Goal
Meta data characteristic value DB
(Soccer)
x_1 : Player M
x_2 : Player X
x_3 : Pass
x_4 : Shot
x_5 : Goal
x_N
33
Content C_i
Content frequency
Content score
31
CFreq_i
cf_i1
cf_i2
cf_iN
36
CScore_ip
cs_ip1
cs_ip2
cs_ipN
37

FIG. 4

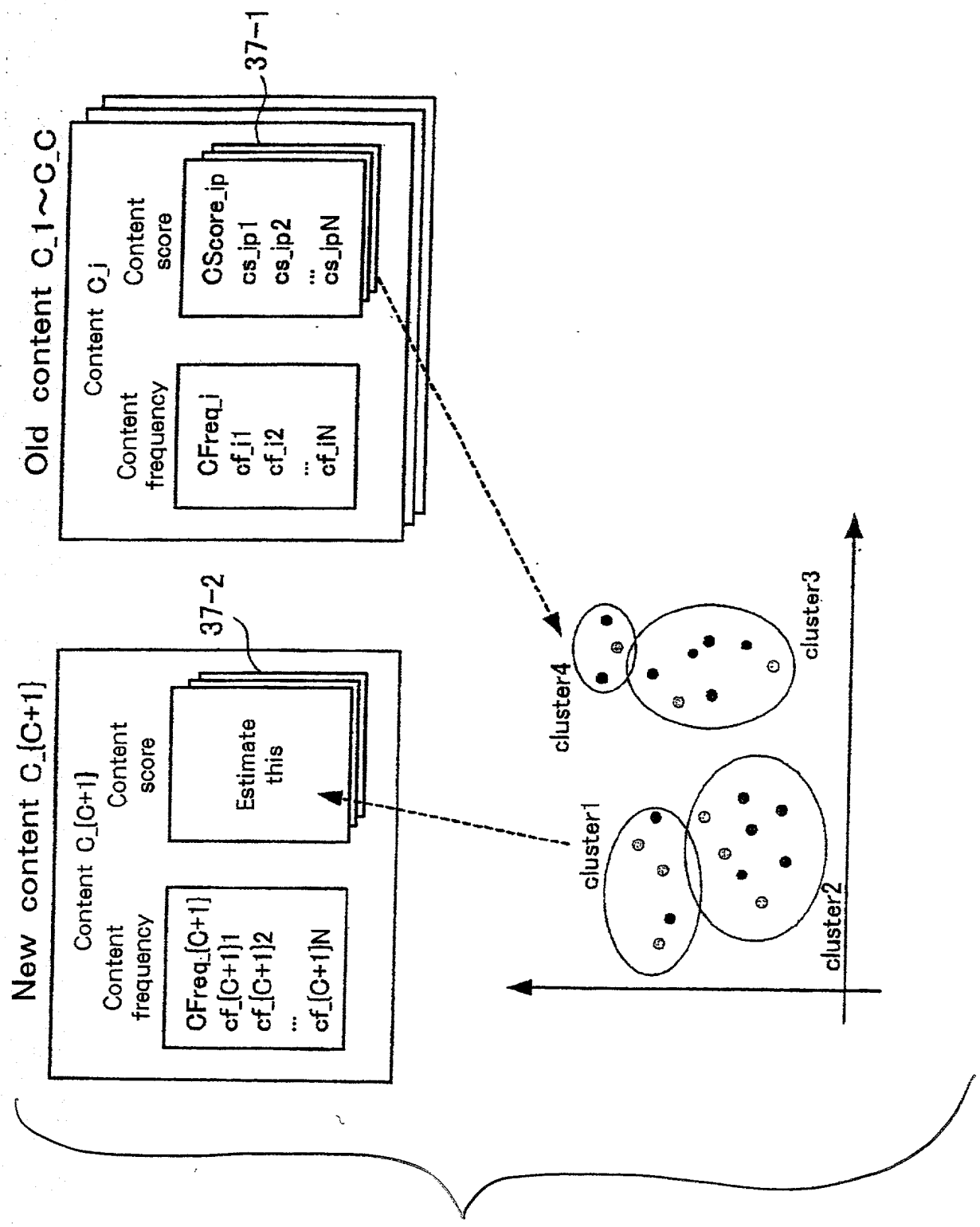

Old content C_1~C_C
Content C_j
Content frequency
CFreq_i
cf_i1
cf_i2
...
cf_iN
Content score
CScore_ip
cs_ip1
cs_ip2
...
cs_ipN
37-1
New content C_(C+1)
Content C_(C+1)
Content frequency
CFreq_(C+1)
cf_(C+1)1
cf_(C+1)2
...
cf_(C+1)N
Content score
Estimate this
37-2
cluster1
cluster2
cluster3
cluster4

FIG. 5

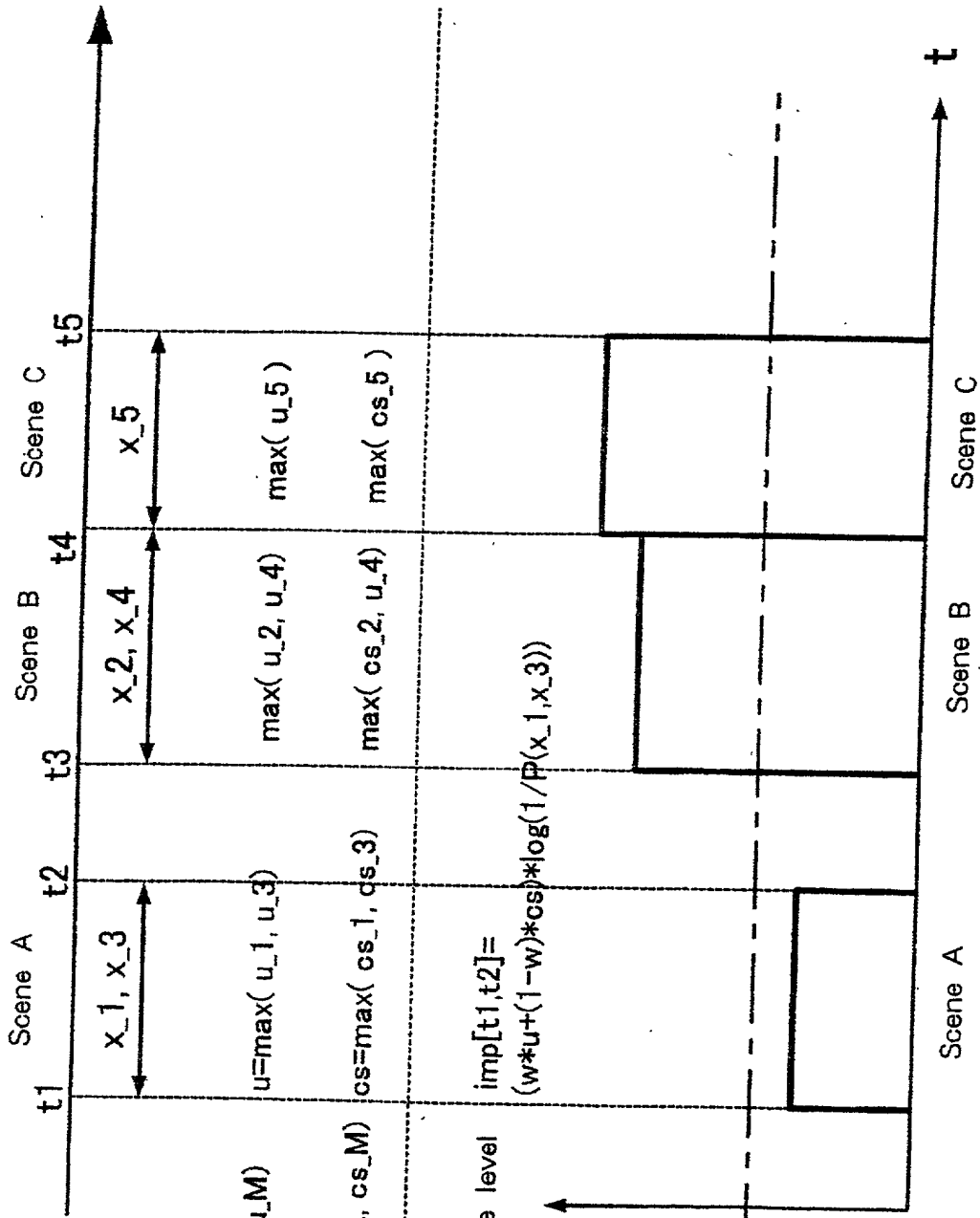

Content_i
Meta data
u = max( u_L, ..., u_M)
cs = max( cs_L, ..., cs_M)
Video importance level
Threshold value
t
t1
t2
t3
t4
t5
Scene A
Scene B
Scene C
x_1, x_3
x_2, x_4
x_5
u=max( u_1, u_3)
cs=max( cs_1, cs_3)
max( u_2, u_4)
max( cs_2, u_4)
max( u_5 )
max( cs_5 )
imp[t1,t2]=
(w*u+(1-w)*cs)*log(1/P(x_1,x_3))
Scene A
Scene B
Scene C

FIG. 6

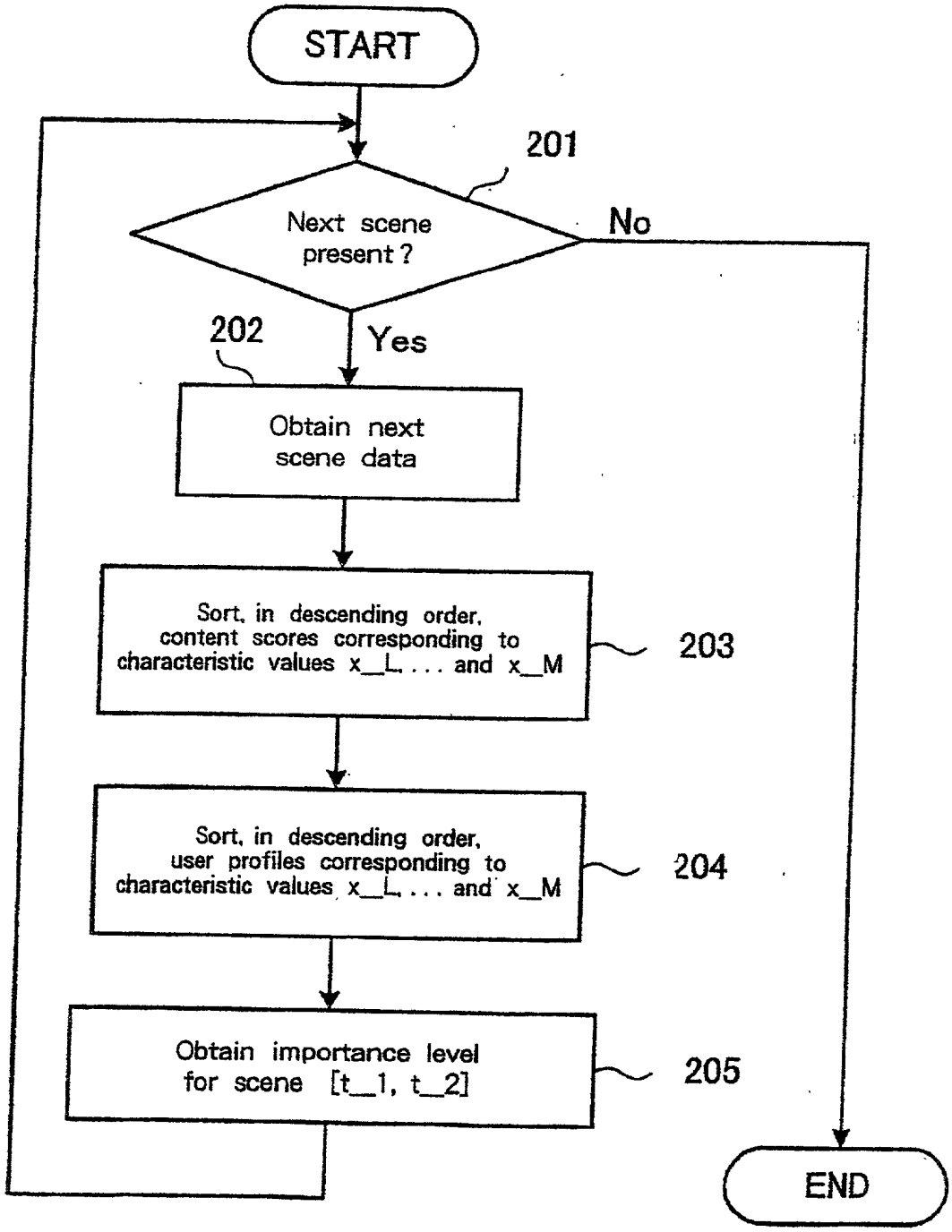
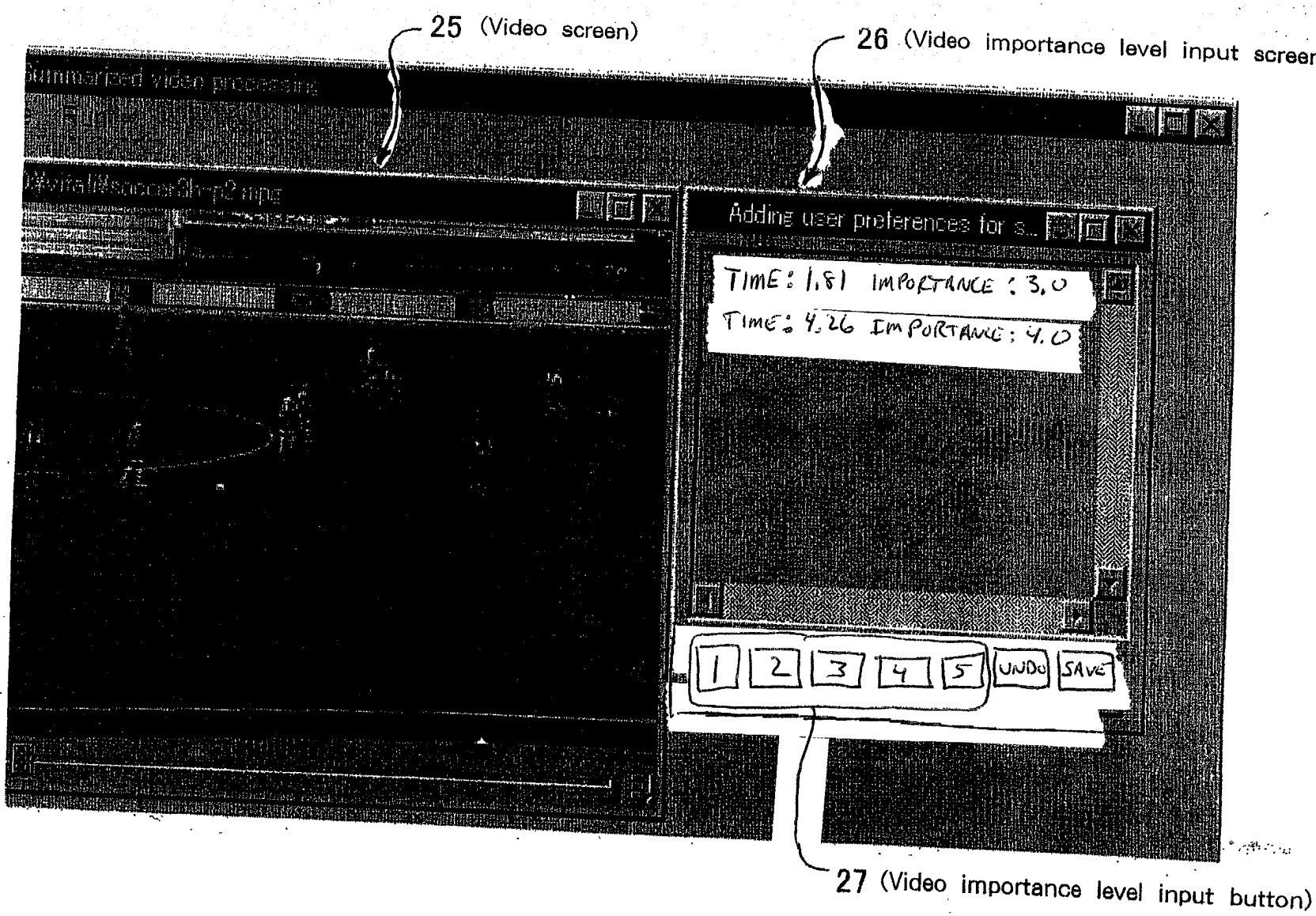

START
201
Next scene present ?
No
Yes
202
Obtain next scene data
Sort, in descending order, content scores corresponding to characteristic values x_1, ... and x_M
203
Sort, in descending order, user profiles corresponding to characteristic values x_1, ... and x_M
204
Obtain importance level for scene [t_1, t_2]
205
END

FIG. 7


25 (Video screen)
26 (Video importance level input screen)
Summarized video processing
Adding user preferences for s...
TIME: 1.81 IMPORTANCE : 3.0
TIME: 4.26 IMPORTANCE : 4.0
1
2
3
4
5
UNDO
SAVE
27 (Video importance level input button)

F16.8

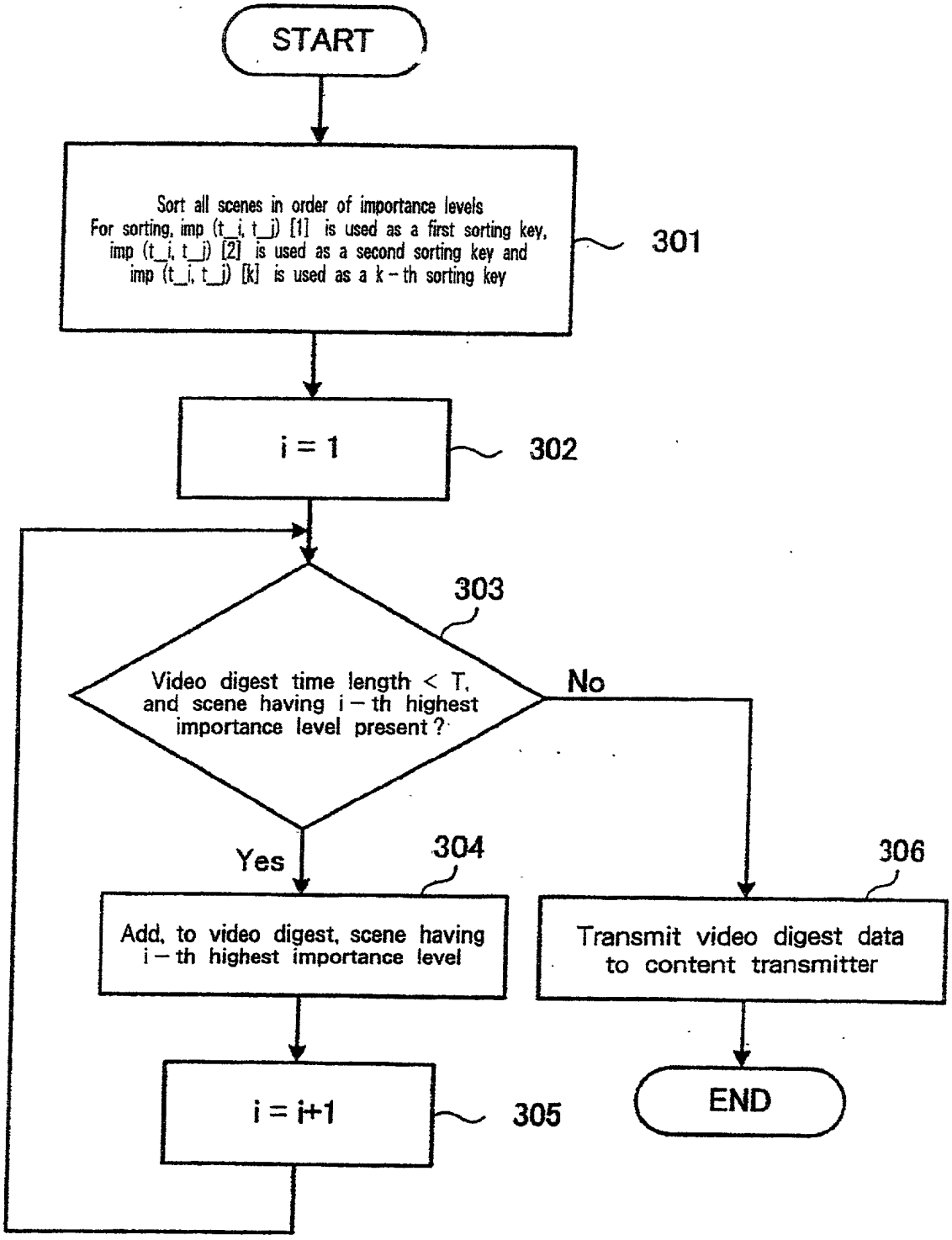

START
Sort all scenes in order of importance levels
For sorting, imp (t_i, t_j) [1] is used as a first sorting key,
imp (t_i, t_j) [2] is used as a second sorting key and
imp (t_i, t_j) [k] is used as a k-th sorting key
301
i = 1
302
303
Video digest time length < T,
and scene having i-th highest
importance level present?
No
Yes
304
Add, to video digest, scene having
i-th highest importance level
306
Transmit video digest data
to content transmitter
i = i+1
305
END

FIG. 9

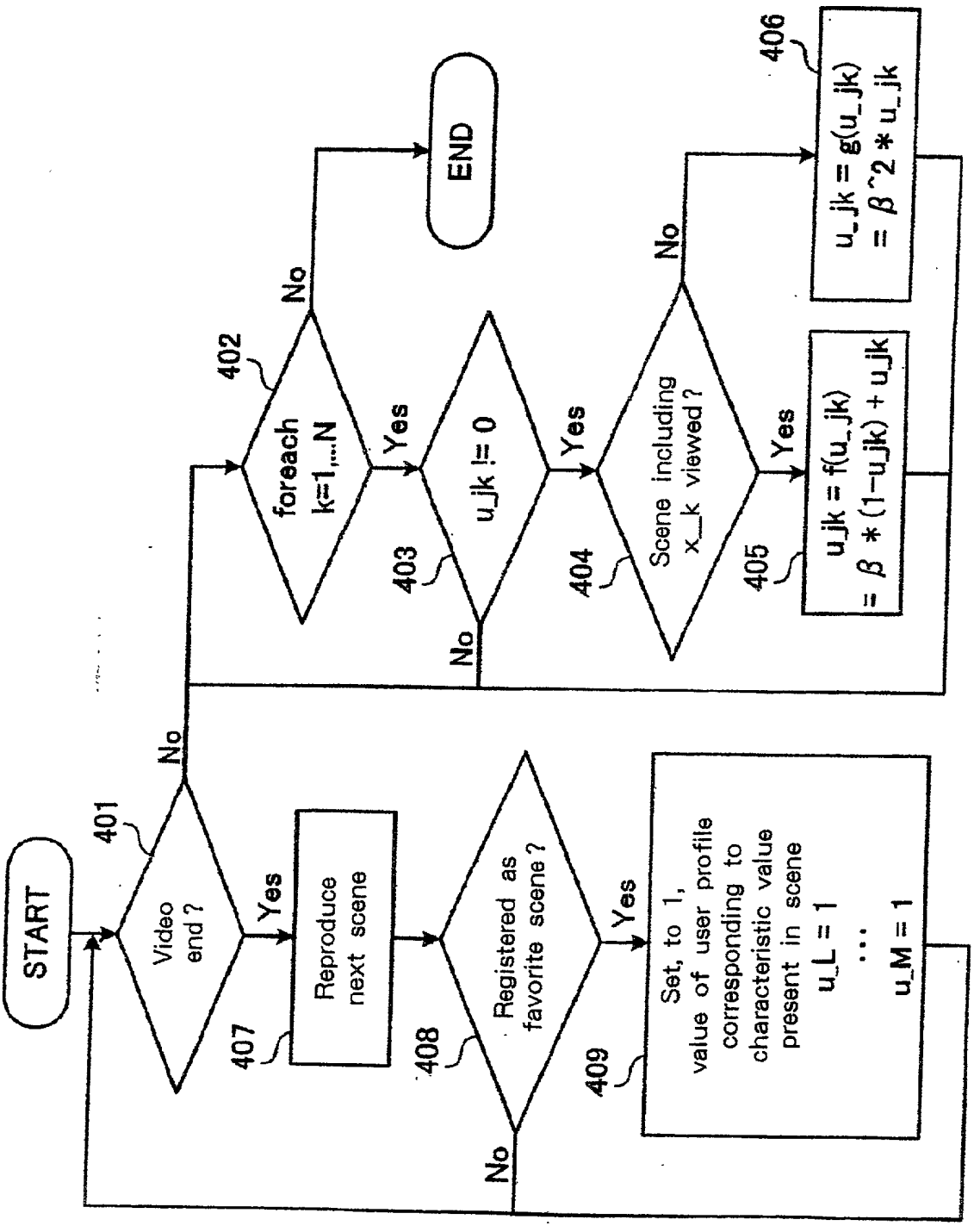

START
401
Video end ?
No
Yes
407
Reproduce next scene
408
Registered as favorite scene ?
No
Yes
409
Set, to 1, value of user profile corresponding to characteristic value present in scene
u_L = 1
...
u_M = 1
402
foreach k=1,...N
No
Yes
END
403
u_jk != 0
No
Yes
404
Scene including x_k viewed ?
No
Yes
405
u_jk = f(u_jk) = β * (1−u_jk) + u_jk
406
u_jk = g(u_jk) = β^2 * u_jk

FIG. 10

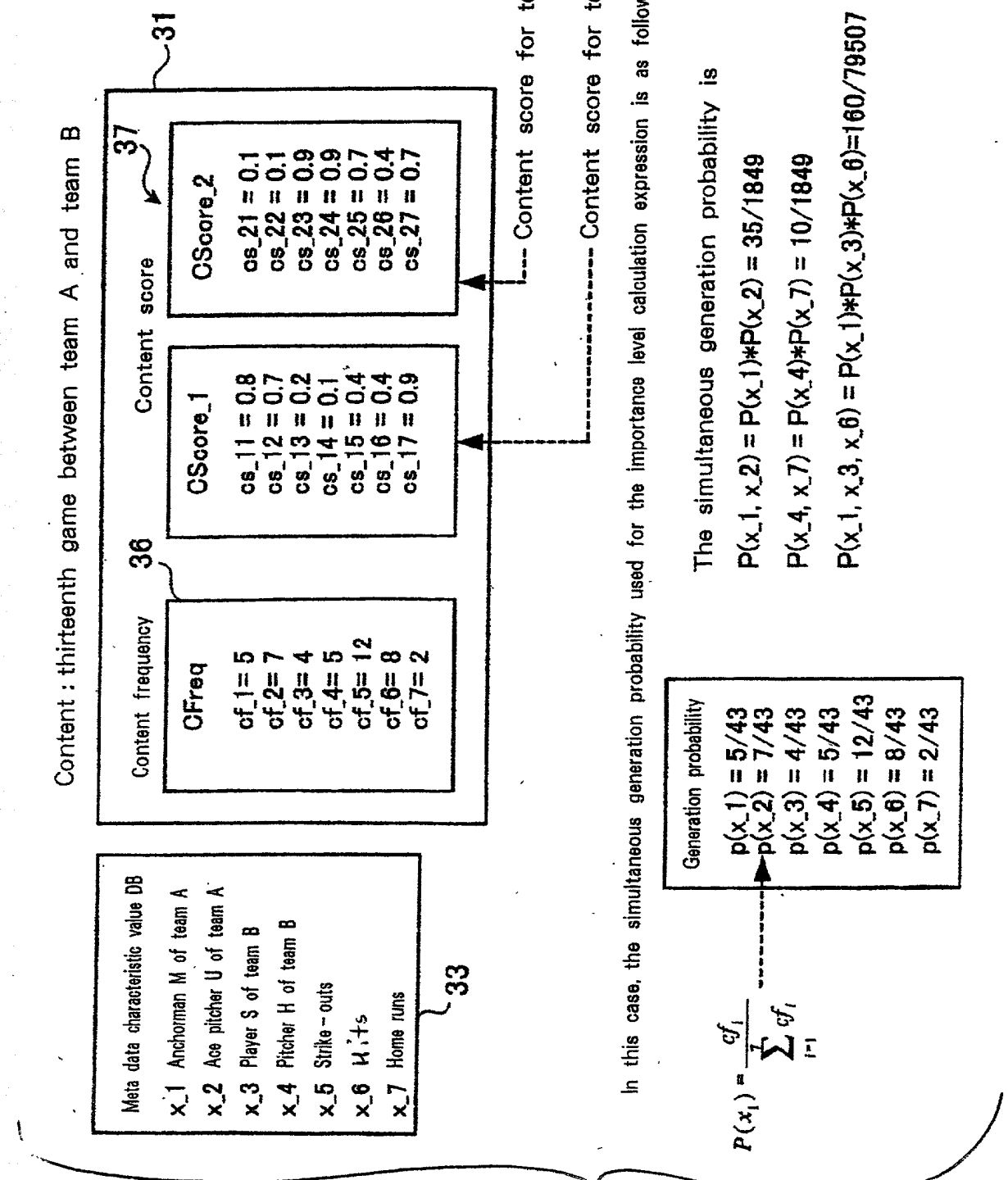

Content : thirteenth game between team A and team B
31
Content frequency
36
CFreq
cf_1= 5
cf_2= 7
cf_3= 4
cf_4= 5
cf_5= 12
cf_6= 8
cf_7= 2
Content score
37
CScore_1
cs_11 = 0.8
cs_12 = 0.7
cs_13 = 0.2
cs_14 = 0.1
cs_15 = 0.4
cs_16 = 0.4
cs_17 = 0.9
CScore_2
cs_21 = 0.1
cs_22 = 0.1
cs_23 = 0.9
cs_24 = 0.9
cs_25 = 0.7
cs_26 = 0.4
cs_27 = 0.7
Content score for team B
Content score for team A
Meta data characteristic value DB
x_1 Anchorman M of team A
x_2 Ace pitcher U of team A
x_3 Player S of team B
x_4 Pitcher H of team B
x_5 Strike - outs
x_6 Hits
x_7 Home runs
33
In this case, the simultaneous generation probability used for the importance level calculation expression is as follows
$P(x_i) = \frac{cf_i}{\sum_{i=1}^{7} cf_i}$
Generation probability
p(x_1) = 5/43
p(x_2) = 7/43
p(x_3) = 4/43
p(x_4) = 5/43
p(x_5) = 12/43
p(x_6) = 8/43
p(x_7) = 2/43
The simultaneous generation probability is
P(x_1, x_2) = P(x_1)*P(x_2) = 35/1849
P(x_4, x_7) = P(x_4)*P(x_7) = 10/1849
P(x_1, x_3, x_6) = P(x_1)*P(x_3)*P(x_6)=160/79507

Fig. 11

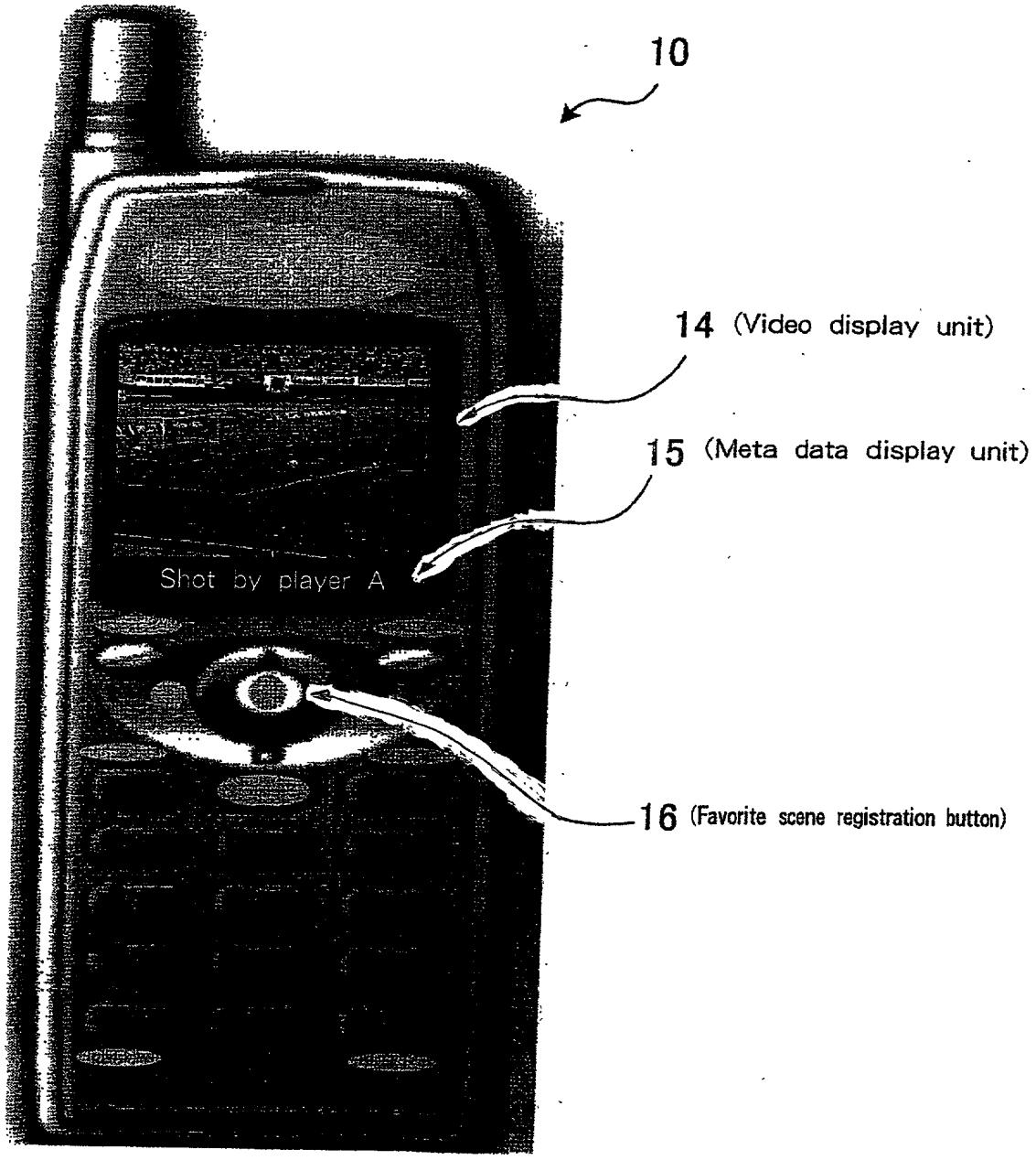

10
14 (Video display unit)
15 (Meta data display unit)
Shot by player A
16 (Favorite scene registration button)

FIG. 12